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Agile-Based CRM System Development to Improve Customer Satisfaction in Cargo Companies

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ABSTRACT
This research highlights the problem of increasing competition and customer expectations in the cargo industry, which demands responsive and innovative solutions to improve customer satisfaction. In the face of these challenges, the research used the Agile approach in developing a Customer Relationship Management (CRM) system as an appropriate solution. The research method involves user requirements analysis, iterative system development, and comprehensive functional testing. The results show that implementing a CRM system based on the Agile approach can improve customer service efficiency, personalize customer interactions, and improve decision-making. The contribution of this research lies in proposing an approach that can be applied in the context of the cargo industry to improve customer satisfaction, as well as providing practical insights for cargo companies in designing and implementing effective CRM systems in a competitive environment.

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INTRODUCTION

The cargo industry, a vital pillar of the global economy, not only propels international trade but also facilitates the distribution of goods through diverse transportation modes. However, despite its commendable contribution to economic growth, the industry grapples with many formidable challenges(Bowen & Leinbach, 2003; De Siqueira Silva et al., 2022; Merz et al., 2023; Serinkan et al., 2014). These encompass mounting global competition, volatile fuel prices, evolving trade regulations, and the ever-increasing complexity of customer demands.

Customer satisfaction is a crucial factor for the success of cargo companies. In the context of fierce competition, the level of customer satisfaction has a significant impact on customer loyalty, customer retention, and company profitability. Satisfied customers are loyal and may recommend the cargo company's services to others. Conversely, customer disappointment can lead to a poor company reputation and potential loss of business(Ahn, 2023; Farafontova et al., 2022; Konoplev et al., 2021; Kováciková et al., 2023; Mingaleva et al., 2022; Narayanan et al., 2022; Ulitskaya et al., 2022).

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Customer Relationship Management (CRM) systems are becoming an essential strategic tool for cargo companies to improve customer satisfaction. CRM manages interactions with customers and prospects to improve customer retention, strengthen relationships, and increase sales. By implementing an effective CRM system, cargo companies can improve customer service efficiency, personalize customer interactions, and make better decisions based on customer data analysis(Densberger & Bachkar, 2022; Garro et al., 2023; Naumov et al., 2021; Pobedinsky, 2022; Schünemann et al., 2022; Sung et al., 2022; Wang et al., 2023).

The Agile approach offers a responsive and adaptive framework in CRM system development for cargo companies(Al-Saqqa et al., 2020; Bomström et al., 2023; Dingsoeyr et al., 2019; Dingsøyr et al., 2012; Santos et al., n.d.; Serrador & Pinto, 2015; Shrivastava & Rathod, 2014). Unlike traditional approaches that tend to be linear and structured, Agile approaches emphasize team collaboration, open communication, and continuous delivery. By applying Agile principles, cargo companies can develop CRM systems more quickly, responding to changing customer needs and fast-changing business dynamics(Akhtar et al., n.d.; Alami et al., 2022, 2023; Almeida et al., 2022; Estrada-Esponda et al., 2024; Hasan et al., 2013).

Although the literature has reviewed various aspects of CRM system development and implementation, there still needs to be a gap in understanding how cargo companies can integrate Agile approaches in their CRM system development. This research aims to fill this knowledge gap by identifying best practices in applying Agile approaches in CRM system development in cargo companies. The results of this study will likely provide new insights that can contribute to the theory and practice of CRM system development in the context of the cargo industry.

METHODS

The development process of an Agile-based CRM system begins with the requirements definition stage, where user needs and requirements are identified, documented, and analyzed to establish SMART goals and metrics for measuring success. Next, an appropriate Agile methodology is selected in the planning stage, a development roadmap is created, prioritized features are determined, and user stories are compiled. Then, the development phase was carried out iteratively, focusing on continuous development, involving users, and applying Agile principles. Various testing processes were conducted to ensure system quality, including unit, integration, system, and user acceptance testing, followed by refinement and retesting. Finally, the CRM system is prepared for deployment into production by preparing the infrastructure, migrating data, and training users. All these stages are integral to developing an adaptive and responsive CRM system, ensuring that the result meets the needs and requirements of users and brings added value to the company.

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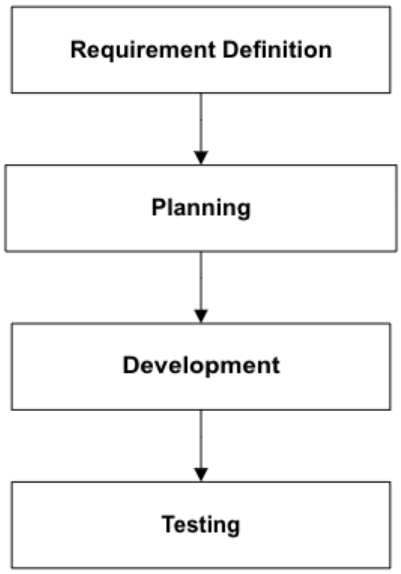

Figure 1. Research Stages

Needs Definition

In this stage, user needs and requirements are analyzed by identifying and documenting the needs of various levels, such as operational staff, supervisors, and management. This is done through interviews, surveys, and observations to collect the necessary data. The collected data is then analyzed to identify patterns and trends and prioritize user needs and requirements based on their urgency and impact on customer satisfaction. In addition, CRM system goals and objectives are set with SMART (Specific, Measurable, Achievable, Relevant, and Time-bound) metrics, which are determined to measure the success of the CRM system in achieving these goals.

Planning

The planning stage involves selecting the proper Agile methodology, determining the roles and responsibilities of the development team, creating a development roadmap, prioritizing the features to be developed at each iteration, creating clear and concise user stories, and selecting tools and technologies that suit the project's needs.

Development

In the development phase, the CRM system is developed iteratively in short sprints with a focus on continuous delivery. The development process is carried out by applying the selected Agile methodology, involving users in the development process, and getting feedback from them to improve the quality of the CRM system.

Testing

The testing phase involves various types of testing such as unit testing, integration, system, and user acceptance testing (UAT) to ensure the CRM system meets the needs and requirements of the users. Any bugs or problems found during the testing process are fixed and retested to ensure the success of the fixes. Finally, the CRM system is prepared for deployment into production by preparing the infrastructure, migrating data, and training users on how to use the CRM system effectively.

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RESULTS AND DISCUSSION

Requirements Definition

The Needs Definition in Table 1 shows a systematic series of steps in preparing a solid foundation for CRM system development. The process began with identifying needs from various organizational levels, including operational staff, supervisors, and upper management. Diverse data collection methods, such as interviews, surveys, and observations, were used to gain a comprehensive and accurate view of user needs and requirements. Careful data analysis was then conducted to identify patterns and trends underlying the needs, enabling prioritization based on urgency and impact on customer satisfaction. Furthermore, setting CRM system goals and objectives using the SMART approach provides a clear and measurable direction for system development, while establishing success metrics enables objective evaluation of system performance concerning relevant indicators, such as customer service response rates and customer retention rates. Thus, the Requirements Definition Stage is critical in ensuring a comprehensive understanding of user needs and setting a clear and measurable direction for CRM system development, an essential foundation for overall project success.

Table 1. Results of Needs Definition

Step	Results
Requirement level identification	- Needs of operational staff, supervisors, and management identified.
Data collection	- Data was collected through interviews, surveys and observations.
Data analysis	- Patterns and trends in the data are identified. - User needs and requirements are prioritized based on their urgency and impact on customer satisfaction.
Establishment of CRM system goals and objectives	- The goals and objectives of the CRM system are set using the SMART approach. Objective: Improve customer service efficiency by 20% within 6 months.
Establishment of success metrics	- Metrics are established to measure the success of the CRM system in achieving the set goals and objectives. - Metrics: Customer service response rate, customer issue resolution time, and customer retention rate.

Planning

The Planning Stage analysis in Table 2 displays a structured and strategic process in preparing to develop an Agile-based CRM system. The selection of an appropriate Agile methodology, Scrum, demonstrated awareness of the need for an adaptive and change-responsive approach. The next step involved establishing clear roles and responsibilities for development team members, including critical roles such as Scrum Master, Product Owner, and development team members. Creating a development roadmap that includes development sprints and milestones provides a clear view of the direction of system develop-

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ment, enabling effective planning and setting appropriate expectations for project progress. Prioritization of features based on user needs and priorities ensures that development is carried out, focusing on elements that provide the most significant added value to users. Creating clear and concise user stories becomes an effective communication between the development team and stakeholders. At the same time, selecting tools and technologies that suit the project needs ensures a robust infrastructure to support system development. Overall, the Planning phase provides a solid foundation for project success by setting the direction, roles, priorities, and tools necessary to develop an adaptive and responsive CRM system.

Table 2. Planning

Planning Elements	Results
Selection of Agile Methodology	- The right Agile methodology has been chosen for the CRM system development project, namely Scrum.
Determination of Roles and Responsibilities	- The roles and responsibilities of development team members are clearly defined, including the Scrum Master, Product Owner, and development team members.
Development Roadmap Creation	- A development roadmap was created to outline the overall evolutionary path of the project, specifying development sprints and important milestones.
Prioritization of Features	- The features to be developed in each iteration were prioritized based on user needs and priorities. Features that are directly related to customer interaction are given high priority.
Creation of User Stories	- Clear and concise user stories have been created to describe detailed user requirements, feature descriptions, acceptance criteria, and usage scenarios.
Selection of Tools and Technology	- Tools and technologies appropriate to the project's needs have been selected to support the development of the CRM system, Jira for project management, and Git for code version control.

Development

The Development phase of CRM system development involves a series of steps essential to realize the vision and user needs. The process starts with iterative development in short sprints, where the development team regularly produces functional system parts in short periods. This approach enables rapid adaptation to changing user needs or priorities and ensures continuous delivery of valuable features. Furthermore, applying Agile methodology becomes a fundamental cornerstone in development, ensuring flexibility and responsiveness in the face of change. A structured framework allows teams to manage projects efficiently, maintain transparency, and ensure effective collaboration. User involvement is critical to ensuring the developed system meets their needs during this stage. Users are actively involved in the development process, providing valuable feedback, validating the features that have been developed, and identifying new needs that arise. Direct interaction

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with users helps the development team better understand the system's context and ensure that the development proceeds as expected.

In addition, the development team also continuously gets feedback from users about the features that have been developed. This feedback becomes the foundation for continuously improving the quality of the CRM system. The team can quickly respond to emerging needs and issues by receiving direct feedback from users, ensuring that the final product meets high-quality standards and user expectations. Overall, the Development stage is essential in the CRM system development journey. With an iterative approach, application of Agile methodologies, active user involvement, and continuous feedback utilization, the development team can produce a CRM system that meets user needs, is adaptive to change, and is high quality.

Table 3. Sprint

Sprint	Description	Destination	Key Features
1	Basic platform development	Building the basic structure of the CRM system	- Customer database creation - Basic user interface creation
2	Basic feature implementation	Adding basic features for contact management	- Add contact search feature - Add new contact feature
3	Integration with other systems	Integrating the CRM system with the company's financial system	- Synchronize customer data with financial system - Add auto-synchronization feature
4	User interface customization	Improving the user interface layout	- Main page layout adjustment - Improve user interface navigation
5	Implementation of customer analysis features	Adding customer analysis features to improve insight	- Add customer data analysis feature - Add customer analysis report feature

Testing

The testing process involves various types of tests, ranging from unit testing to user acceptance testing (UAT), designed to evaluate the system's functionality, performance, and conformance to user needs and requirements. During this process, any bugs or issues detected are carefully identified, logged, and fixed by the development team. The fixes made are then retested to ensure their success and that there is no negative impact on other parts of the system. In addition, this stage also includes preparing the CRM system for

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widespread deployment in a production environment. This includes infrastructure preparation, data migration, and user training on how to use the CRM system effectively. Thus, the result of the Testing Stage is a CRM system that has been thoroughly tested, free of significant bugs or issues, and ready to be widely deployed in an actual production environment. This stage is essential in ensuring that users will have a smooth and satisfying experience when using the CRM system.

Table 5. Testing Results

Testing Stages	Description	Results
Functional Testing	Testing to ensure that every feature and function of the system works according to specifications and requirements.	All features and functions of the system have been tested and function to the specified specifications and needs.
User Acceptance Testing (UAT)	Testing conducted by end users to validate whether the system meets their needs and expectations.	End users have successfully validated the system and confirmed that it meets their needs and expectations.

Analysis of Table 5 functional testing and UAT results confirms that the CRM system went through a comprehensive series of tests before being officially launched to end users. The functional testing stage indicates that each feature and function of the system has been examined in detail to ensure conformity with the specifications and requirements that have been set. The positive results of the functional testing indicate that the system performs well in terms of functionality. Meanwhile, the UAT stage provided an overview of user satisfaction validation, where end users successfully validated the system, confirming that the system met their expectations in terms of functionality and performance. These results gave the development team confidence that the system had reached a sufficient level of readiness to be officially launched to end users. Thus, functional testing and UAT have played an essential role in ensuring the quality and readiness of the CRM system before it is implemented in an actual production environment.

CONCLUSION

With increasing growth, the cargo industry plays a strategic role in the economy but faces several challenges, including intensified competition and higher customer expectations. In this context, implementing an effective CRM system can be the right solution to increase customer satisfaction by providing more personalized and responsive services. The Agile approach to CRM system development allows cargo companies to adapt to rapid changes and produce solutions that better suit customer needs. By iteratively developing the system and collaborating with users, cargo companies can produce CRM systems that are more efficient, personalized, and innovative. This research makes a new contribution to the literature by proposing an approach that can be applied in the context of the cargo industry to improve customer satisfaction. In addition, the results of this study also provide practical

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insights for cargo companies in designing and implementing effective CRM systems to improve their performance in a competitive market.

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